"Project Report to the NYS IPM Program, Agricultural IPM 2002–2003."

1. Title:

Monitoring Growing Degree-Days in Commercial Greenhouses for Predicting Western Flower Thrips Emergence.

2. Project Leader(s):

Gary Couch, Ornamentals IPM Specialist – Hudson Valley, NYS IPM Program, Cornell Coop. Exten. of Orange County
John Sanderson, Dept. of Entomology, Cornell University, Ithaca, NY

3. Cooperator(s):

Rose Baglia, Extension Educator, CCE Orange Co., Commercial Horticulture
Teresa Rusinek, Extension Educator, CCE Ulster Co.
Jim Leghorn, Leptondale Greenhouses, Orange Co., NY

4. Type of grant:

Please select the category that best describes your project:

- Monitoring, forecasting and thresholds
- Biological control and pest biology

5. Project location(s):

This applied research project was conducted in commercial greenhouses in Orange County, but findings could be applied throughout the temperate climatic regions of the U.S.

6. Abstract:

We intend to examine the possible relationship between degree-day (DD) accumulation and sticky trap catches of Western flower thrips (*Frankliniella occidentalis*) (WFT) in commercial greenhouses. Successful correlation of trap catches to DD accumulation could result in accurate prediction of the onset of adult thrips emergence in the greenhouse that would allow more timely application of control tactics such as releases of predaceous mites or insecticide applications.

7. Background and justification:

The western flower thrips, *Frankliniella occidentalis* Pergande (WFT), is presently the most serious pest problem of the greenhouse industry. WFT is the key pest of nearly all flower, bedding plant, and foliage and potted plant crops grown in the state.

In 2001 we focused on methods to make the cost of using the predacious mite, *Neoseilus cucumeris*, more competitive with traditional insecticide management. The results suggested that it might be possible to reduce the cost by delaying the initial release of the predators until thrips captured on sticky cards reached a predetermined threshold. However, the lag time between detection and delivery of the mites (7-10 days post ordering) results in a window of vulnerability to both thrips population increase and virus transmission. Having a reliable predictive tool, such as monitoring DD accumulation, rather than a reactive tool (thrips adults on sticky traps) could allow delivery of the predacious mites to closely coincide with the initial presence of thrips, resulting in better management. Insecticide applications for WFT could also be optimally timed with this predictive tool. This tool would be most useful to those growers who close down some or all of their greenhouses for part of the winter.

Several studies have estimated the lower developmental threshold temperature and degree-day accumulation for immature development of WFT (Jarosik et al. 1997, McDonald et al. 1998). Jarosik et al (1997) suggested that a degree-day accumulation of 231DD (°C) above a lower developmental threshold of 10.7°C could be used to predict when damage is likely to occur on greenhouse cucumber. Estimates such as these can be evaluated for applicability to bedding plant crop systems.

8. Objectives:

1) Monitor both temperatures (to sum daily degree-day accumulations) and thrips catches on sticky traps in the beginning of Spring crop production in several commercial greenhouses.
2) Evaluate the results.

9. Procedures:

We intended to place temperature recorders in three commercial greenhouse as soon as heat was turned on in each one (sometime during January through March), using HOBO temperature monitors to record hourly temperatures. Simultaneously, yellow sticky traps were to be placed in each greenhouse and thrips catches recorded at least weekly. Using a lower developmental threshold of 50°F, DD were to be calculated and summed from the onset of the study. The DD accumulation from the start of the study until the first thrips appeared on a trap, the first peak trap catch, as well as other trap catch observations, would be noted and compared with literature reports of DD accumulation for WFT. We would also work backward from the trap catch observations to look for logical correlations. Lastly, we would also examine the use of various lower temperature thresholds and DD accumulations (staying within the range reported in various scientific papers).

10. Results and discussion:

In most NY greenhouse businesses, Spring crop production begins between January and March. This is when growers will begin heating their greenhouses. A study of the DD accumulation of an insect must occur when temperatures will begin to be above the insect's lower developmental threshold temperature, which is ca. 50°F for WFT. Thus, our study needs to begin prior to or as the greenhouses are being heated to be able to correlate DD accumulation with trap catches. The NYS IPM grants program announces the results of successful grant applications in April, which is too late to conduct our study in the year that the final project reports are due. We were somewhat optimistic about being funded, and monitored temperatures and sticky trap catches in three commercial greenhouses in 2002. But because of funding uncertainty, we were not able to purchase equipment and supplies in time to begin monitoring until well after the temperatures had been exceeding the lower threshold temperature for some time. Our correlations were disappointingly meaningless. However, in early 2003 (before the end of the expenditure deadline for 2002 grants) we will begin our study once again, prior to the onset of greenhouse heating, with anticipation of more meaningful results.
We will report our results in a 2003 report.

11. References:

Jarosik-V; Kolias-M; Lapchin-L; Rochat-J; Dixon-A-F-G. 1997. Seasonal trends in the rate of population increase of *Frankliniella occidentalis* (Thysanoptera; Thripidae) on cucumber. Bull. Entomol. Res. 87 (5): 487-495.
McDonald-Jamie-R; Bale-Jeffery-S; Walters-Keith-F-A. 1998. Effect of temperature on development of the Western flower thrips, *Frankliniella occidentalis* (Thysanoptera: Thripidae). Euro. J. Entomol. 95 (2): 301-306.